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Comparative *in–Vitro* Antimicrobial Study of Ethanolic Seed Extract of *Syzygium cumini* (L.) and Methanolic Leaves Extract *Tecomaria capensis*

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Research Article

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Abstract – The comparative in-vitro anti-bacterial activity was carried out between ethanolic seed extract of *Syzygium cumini* (L.) and methanolic leaves extract *Tecomaria capensis* against *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Enterococcus faecalis* using different concentration of 2, 4, 6 and 8 mg/ml and STD ciprofloxacin 5 mcg. Between these two plants extract the methanolic leaves extract *Tecomaria capensis* shows more anti-bacterial activity than the other.

Keywords – *Syzygium cumini*, *Tecomaria capensis*, anti-bacterial activity

Introduction

Medicinal plants can able to protect from different deadly microbial species. These plants are used in different forms under indigenous systems of medicine like Ayurveda, Sidha and Unani [1]. Rapid and overdose of synthetic tic drugs can cause resistance development in the body [2]. So, in comparison to synthetic drugs herbal medicines are safer [3]. According to WHO, 80% of the world's inhabitants problem should treated by medicinal herbal drug for their primary health care [1].

Syzygium cumini (L.) belongs to family Myrtaceae [3, 4, 5]. It is commonly known as Jamun (Hindi) [3], Naaval (Tamil) [5]. The seeds of *S. cumini* are widely considered to have anti-diabetic properties [3, 4]. The fruits [6] and leaves [7] of *S. cumini* have unique anti-oxidant activity. The seeds have significant anti-inflammatory [8], anticancerous [9] andcentral nervous system [5] activities.

Tecomaria capensis belongs to family bignoniaceae also known as Cape-honeysuckle [10] is a fast growing, scrambling shrub which may grow up to 2-3m high and spread more than 2.5m. Plant is used traditionally to relieve pain and sleeplessness [11]. Dried powdered bark infusions are taken for sleeplessness [12], reported to induce sleep [13] and also as anti-plasmodial activity against *Plasmodium falciparum* [14].

Materials and Methods

Plant material

The leaf of *tecomaria capensis* and seed of *syzygium cumini* are collected from various parts of Tripura. These parts are dried, powered and extracted by methanol and ethanol respectively. The extract was collected, evaporated and kept in desiccators.

Drugs and chemical

The standard drug ciprofloxacin was used for comparision. Methanol and ethanol used in the experiment were of analytical grade.

In-vitro antibacterial activity (Well-diffusion method)

The antibacterial activities of ethanolic seed extract of *Syzygium cumini* (L.) and methanolic leaves extract *Tecomaria capensis* was carried out against different gram positive and gram negative bacteria were carried out by Agar well diffusion method on nutrient agar plates [15]. Test organisms used were *Escherichia coli*, *Staphylococcus* aureus, *Pseudomonas* aeruginosa, *Enterococcus faecalis*. Different concentrations (2 mg/ml- 8 mg/ml) of seed and leaves extract were made and the zone of inhibition was calculated for each concentration. Ciprofloxacin (5mcg) were used as the standards.

Results and Discussion

Four varieties of bacteria were tested for their sensitivity to ethanolic seed extract of *Syzygium cumini* (L.) and methanolic leaves extract *Tecomaria capensis*, antibacterial potency was determined by the well diffusion method. Table 1, 2 and 3 presents diameters of inhibition zones (clear zones around wells) exerted by the various concentrations of ethanolic seed extract of *Syzygium cumini* (L.), methanolic leaves extract *Tecomaria capensis* and standard ciprofloxacin. Between these two plants extract the methanolic leaves extract *Tecomaria capensis* shows more anti-bacterial activity than the other.

Both the plants contain phenolic compounds. Most of the studies on the mechanism of phenolic compounds focused on their effects on cellular membranes. Actually, phenolics not only attacked cell wall and cell membrane, thereby destroying its permeability and releasing of intracellular constituents (ribose, Na glutamate, etc.) but also interfered with membrane function e.g. electron transport, nutrient uptake, protein and nucleic acid synthesis and enzyme activity. That was, active compounds might have several invasive targets which could lead to inhibit the bacteria. Furthermore, leakage of intracellular material was a general phenomenon induced by many antibacterial substances.

Table 1: Antibacterial activity of ethanolic seed extract of *S. cumini*

Sl. No	*Bacteria*	*Zone of inhibition in mm*			
		2 mg/ml	**4 mg/ml**	**6 mg/ml**	**8 mg/ml**
1	*Escherichia coli*	8.1 ± 0.1	8.2 ± 0.1	8.4 ± 0.1	8.5 ± 0.09
2	*Staphylococcus* aureus	5.2 ± 0.7	5.4 ± 0.10	5.7 ± 0.12	5.9 ± 0.07
3	*Pseudomonas* aeruginosa	8.1 ± 0.1	8.2 ± 0.1	8.3 ± 0.11	8.6 ± 0.11
4	Enterococcus *faecalis*	6.2 ± 0.10	6.4 ± 0.08	6.6 ± 0.07	7 ± 0.28

Table 2: Antibacterial activity of methanolic leaves extract *tecomaria capensis*

Sl. No	*Bacteria*	*Zone of inhibition in mm*			
		2 mg/ml	**4 mg/ml**	**6 mg/ml**	**8 mg/ml**
1	*Escherichia coli*	15.8 ± 0.1	19.6 ± 0.1	35.5 ± 0.1	37.7 ± 0.1
2	*Staphylococcus* aureus	13.4 ± 0.1	18±1.22	34.8 ± 0.06	37.6 ± 0.08
3	*Pseudomonas* aeruginosa	11.6 ± 0.08	15.9 ± 0.12	33.5 ± 0.09	34.7 ± 0.11
4	Enterococcus *faecalis*	14..5 ± 0.1	20.8 ± 0.06	33.5 ± 0.24	36.6 ± 0.15

Table 3: Antibacterial activity of standard antibiotics

Bacteria	*Zone of inhibition in mm*
	Ciprofloxacin (5mcg)
Escherichia coli	35.6 ± 0.27
Staphylococcus aureus	30.6 ± 0.18
Pseudomonas aeruginosa	30.5 ± 0.41
Enterococcus *faecalis*	39.3 ± 0.38

Conclusion

Above experiment shows the anti-bacterial activity of both the plant extracts. But methanolic leaves extract *tecomaria capensis* shows more anti-bacterial activity than the other. So, *tecomaria capensis* is a good anti-microbial agent.

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